Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_

**Lab: The Secret Life of the Compound Microscope**

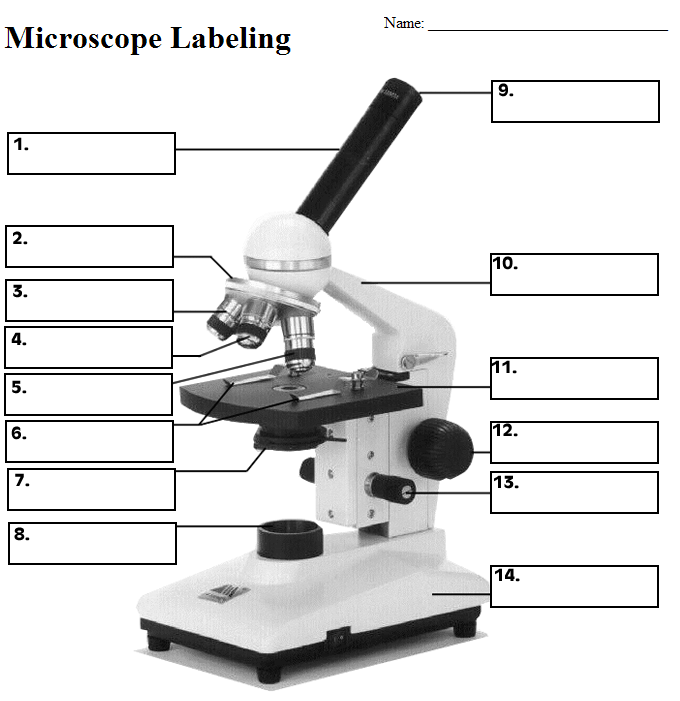
**Pre-Lab (Part 1): Parts of the Microscope**

***Directions:*** *Using Appendix D on Page 1070 in your textbook, complete the table below by providing the funciton of each microscope part.*

|  |  |
| --- | --- |
| **Part** | **Function** |
| Eyepiece |  |
| Body Tube |  |
| Revolving Nosepiece |  |
| Low-Power Objective |  |
| High-Power Objective |  |
| Stage |  |
| Stage Clips |  |
| Diaphragm |  |
| Course Adjustment |  |
| Fine Adjustment |  |
| Light Source/Illuminator |  |
| Base |  |
| Arm |  |

***Microscope Labeling:*** *Label the parts of the microscope. Use the microscope on Page 1070 as a reference.*

*\*\*\*Note:* ***#4*** *is the* ***Scanning Objective****, and* ***#3*** *is the* ***Low-Power Objective****.\*\*\**



**Pre-Lab (Part 2): How to Use the Microscope**

***Directions:*** *Read through the information on the “Microscope Use Tutorial,” and answer the pre-lab questions below.*

1. How do you find the magnification of your specimen? What is the total magnification if the ocular lens is 10X, and the objective lens is 40X?
2. Which objective lens should you start with when viewing your specimen? Why do you think this is?
3. Which objective lens should you be on when you remove a slide from the stage? Why?
4. Which adjustment knob (course or fine) should you use when using the high-power objective lens?
5. What should you do if the specimen is too light or too dark?
6. What information should you include when labeling your drawings of specimens viewed through the microscope?
7. At what level should you angle your cover slip when creating a wet mount slide to prevent bubbles from forming?
8. What is the procedure for staining a slide (summarize the four steps)?
9. Identify one of the common issues with microscope use and identify the solution.

**Lab Procedures**

***Part 1: Field of View***

At each magnification, look through the eyepiece and determine the “diameter of the field of view” by placing a ruler on the stage underneath the objective lens. Fill in the diameters IN MILLIMETERS in the table below.

|  |  |
| --- | --- |
| **Total Magnification** | **Diameter (in mm)** |
| 40X (Using Scanning Objective) |  |
| 100X (Using Low-Power Objective) |  |
| 400X (Using Low-Power Objective) |  |

***Part 2: The Letter E***

Place the slide of the "letter e" on the stage so that the letter is over the hole and is right side up. Use the scanning objective to view the letter and use the coarse knob to focus. Repeat on the low power objective. Finally, switch to high power. Remember at this point, you should only use the FINE adjustment knob.

Draw the "e" as it appears at each magnification. Drawings should be drawn to scale and you should note the orientation of the e in the viewing field (is it upside down or right side up?)

|  |  |  |
| --- | --- | --- |
| SCANNING | LOW | HIGH |

Have your partner push the slide to the left while you view it through the lens. Which direction does the **E** appear to move? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

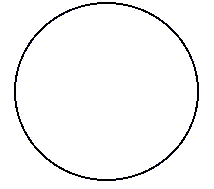
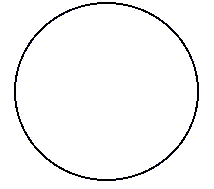
Have your partner push the slide up while you view it through the lens. Which direction does the **E** appear to move?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Part 3: Making Slides***

***Making a Wet Mount: Onion Cells***

1. Take a small piece of onion and using forceps (tweezers), peel off the membrane from the underside (the rough side).
2. Lay the membrane flat on the surface of a clean glass slide, and then add one drop of water.
3. Lower a thin glass cover slip onto the slide from a 45 degree angle. Make sure there are no air bubbles
4. The cells should look a little like lizard skin under the microscope. Once you’ve switched to high power, you should be able to see a nucleus in each cell.
5. Repeat the process after adding a dye solution (iodine or methylene blue). Be very careful; these dyes can stain your skin and clothes. Refer to the Microscope Tutorial for specific directions on how to stain a slide.
6. Sketch the onion cells under a magnification of your choice **before** and **after** staining the cells.
7. Make sure to label the magnification for each picture.

**Onion Before Stain Onion After Stain**



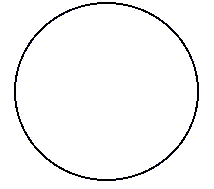
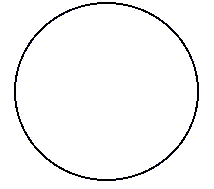
Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Part 4: Prepared Slides***

1. Obtain FOUR different prepared slides.
2. View each slide under the microscope (at whichever magnification you choose) and draw a picture.
3. For each picture, identify the **name of the specimen** and the **magnification.** When finding the magnification, make sure to MULTIPLY the ocular X objective.
4. Under each picture, record THREE observations about what you see in the microscope. You CAN bullet your observations!

**Specimen Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Specimen Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

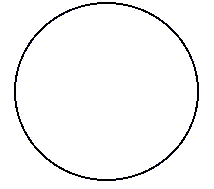
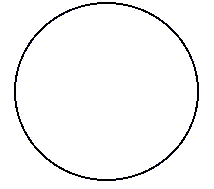
**Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



**Observations: Observations:**

**Specimen Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Specimen Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Magnification: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



**Observations: Observations:**

**Post-Lab**

***Review:*** Determine whether each of the following statements is TRUE or FALSE. Write the FULL WORD (true or false) in the space to the left of each statement.

\_\_\_\_\_\_\_\_\_\_ On high power, you should use the coarse adjustment knob.  
\_\_\_\_\_\_\_\_\_\_ The diaphragm determines how much light shines on the specimen.  
\_\_\_\_\_\_\_\_\_\_ The low power objective has a greater magnification than the scanning objective.   
\_\_\_\_\_\_\_\_\_\_ The fine focus knob visibly moves the stage up and down.  
\_\_\_\_\_\_\_\_\_\_ Images viewed in the microscope will appear upside down.   
\_\_\_\_\_\_\_\_\_\_ If a slide is thick, only parts of the specimen may come into focus.   
\_\_\_\_\_\_\_\_\_\_ The type of microscope you are using is a scanning microscope.  
\_\_\_\_\_\_\_\_\_\_ For viewing, microscope slides should be placed on the objective.   
\_\_\_\_\_\_\_\_\_\_ In order to switch from low to high power, you must rotate the revolving nosepiece.  
\_\_\_\_\_\_\_\_\_\_ The total magnification of a microscope is determined by adding the ocular lens power to the objective lens power.

***Conclusion:*** In the space below, write 5 COMPLETE SENTENCES about what you learned in this lab. You must mention the following things in your paragraph:

-Parts of the microscope/ procedures for using the microscope

-Observations from viewing the “E” slide

-Observations from viewing the onion cell

-Observations from viewing the prepared slides

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_